ﾌﾞM

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/036,747	11/08/2001	W. Bastiaan Kleijn	020184-000900US	3695

20350 7590 06/03/2005

TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER	
LERNER, MARTIN	

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/036,747	KLEIJN, W. BASTIAAN	
	Examiner	**Art Unit**	
	Martin Lerner	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 14 March 2005.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1 to 28 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1 to 28 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 to 9, 11 to 19, and 21 to 28 are rejected under 35 U.S.C. 102(b) as being anticipated by *Ozawa*.

Regarding independent claim 1, *Ozawa* discloses a method of postfiltering a signal, comprising:

"receiving a distorted input signal that includes an embedded corrupting signal, wherein the embedded corrupting signal is statistically related to the undistorted sound signal" – signal *S(n)* is a distorted input signal, in that it has a noise components (column 5, lines 54 to 64: Figure 1); statistical properties of the signal are properties of the input signal, and not of the invention *per se*; implicitly, there are generally components of the noise that are related to the signal, as admitted by the Specification, Page 4, Lines 25 to 34;

"determining an enhancement signal by finding a difference between the distorted input signal and the enhanced output signal, whereby the enhancement signal attempts to offset the embedded corrupting signal" – *S(n)* is the distorted input signal

and $y(n)$ is the enhanced output signal; an enhancement signal as a difference is represented by the summation terms on the right hand side of Equation (12) (column 5, lines 54 to 64: Figure 1); the enhancement signal, represented by the summation terms on the right hand side of Equation (12), is a filtering operation for spectrum postfilter 20, which filters the distorted input signal $S(n)$ to improve sound quality ("to offset the embedded corrupting signal"), based upon linear prediction coefficients a_i and c_i (column 5, lines 31 to 59: Figure 1);

"analyzing the enhancement signal, whereby the enhancement signal is separately operated upon as a unit" – compensation filter coefficient calculation circuit 35 receives linear prediction coefficients a_i and c_i of enhancement signal and outputs a compensation coefficient q_i (column 5, line 65 to column 6, line 10: Figures 1 and 3);

"producing the enhanced output signal, based at least in part upon the analyzing step" – compensation filter 30 generates a transfer function for enhancing enhanced output signal $y(n)$ by adaptively eliminating spectrum tilt to produce an additionally enhanced output signal $g(n)$, where output signal $g(n)$ is calculated based upon compensation coefficients q_i, which in turn were based upon linear prediction coefficients a_i and c_i from compensation filter coefficient calculation circuit 35 (column 6, lines 29 to 58: Figure 1).

Regarding independent claim 13, *Ozawa* discloses a method of postfiltering a signal, comprising:

"receiving a distorted input signal that includes an embedded corrupting signal, wherein the embedded corrupting signal is statistically related to the undistorted sound signal" – signal *S(n)* is a distorted input signal, in that it has a noise components (column 5, lines 54 to 64: Figure 1); statistical properties of the signal are properties of the input signal, and not of the invention *per se*; implicitly, there are generally components of the noise that are related to the signal, as admitted by the Specification, Page 4, Lines 25 to 34;

"estimating a first iteration enhanced output signal" – *S(n)* is the distorted input signal and *y(n)* is the enhanced output signal (column 5, lines 54 to 64: Figure 1); output signal *y(n)* represents "a first iteration enhanced output signal" in the sense that each of filters 20, 30, and 40 are further refinements of a desired output signal;

"determining a first iteration enhancement signal by finding a difference between the distorted input signal and the first iteration enhanced output signal" – an enhancement signal as a difference is represented by the summation terms on the right hand side of Equation (12) (column 5, lines 54 to 64: Figure 1); the enhancement signal, represented by the summation terms on the right hand side of Equation (12), is a filtering operation for spectrum postfilter 20, which filters the distorted input signal *S(n)* to improve sound quality based upon linear prediction coefficients a_i and c_i (column 5, lines 31 to 59: Figure 1);

"analyzing the first iteration enhancement signal" – compensation filter coefficient calculation circuit 35 receives linear prediction coefficients a_i and c_i of enhancement

signal and outputs a compensation coefficient q_i (column 5, line 65 to column 6, line 10: Figures 1 and 3);

"producing a second iteration enhanced output signal, based at least in part upon the analyzing step" – compensation filter 30 generates a transfer function for enhancing enhanced output signal *y(n)* ("producing a second iteration enhanced output signal") by adaptively eliminating spectrum tilt to produce an additionally enhanced output signal *g(n)*, where output signal *g(n)* is calculated based upon compensation coefficients q_i, which in turn were based upon linear prediction coefficients a_i and c_i from compensation filter coefficient calculation circuit 35 (column 6, lines 29 to 58: Figure 1); output signal *g(n)* represents "a second iteration enhanced output signal" in the sense that each of filters 20, 30, and 40 are further refinements of a desired output signal.

Regarding independent claim 24, *Ozawa* discloses an apparatus for postfiltering a signal, comprising:

"an enhancement circuit that receives the distorted input signal and produces a first iteration enhanced output signal, wherein the enhancement circuit determines an enhancement signal that is a difference between the enhanced output signal and the distorted input signal" – spectrum postfilter 20, which filters the distorted input signal *S(n)* to improve sound quality based upon linear prediction coefficients a_i and c_i (column 5, lines 31 to 59: Figure 1); *S(n)* is the distorted input signal and *y(n)* is the enhanced output signal (column 5, lines 54 to 64: Figure 1); spectrum postfilter "produces a first iteration enhanced output signal" in the sense that each of filters 20, 30, and 40 are

further refinements of desired output signals *y(n)* and *g(n)*; *S(n)* is the distorted input signal and *y(n)* is the enhanced output signal; an enhancement signal as a difference is represented by the summation terms on the right hand side of Equation (12) (column 5, lines 54 to 64: Figure 1);

"a feedback circuit that uses the first iteration enhanced output signal and the enhancement signal to effect production of a second iteration enhanced output signal by the enhancement circuit" – compensation filter 30 generates a transfer function for enhancing enhanced output signal *y(n)* ("producing a second iteration enhanced output signal") by adaptively eliminating spectrum tilt to produce an additionally enhanced output signal *g(n)* (column 6, lines 29 to 58: Figure 1); output signal *g(n)* represents "a second iteration enhanced output signal" in the sense that each of filters 20, 30, and 40 are further refinements of desired output signals *y(n)* and *g(n)*;

"an output circuit that produces the enhanced output signal upon completion of at least one iteration cycle" – gain adjustment circuit 40 adjusts the gain after spectrum postfilter 20 and compensation filter 30 iteratively improve the output signal; gain adjustment circuit 40 produces a further enhanced output signal (column 6, lines 59 to 61: Figure 1).

Regarding claims 2, 14, and 25, *Ozawa* discloses:

"the analyzing step comprises a step of determining a set of parameters from the enhancement signal" – compensation filter coefficient calculation circuit 35 receives

linear prediction coefficients a_i and c_i ("a set of parameters") of the enhancement signal and outputs a compensation coefficient q_i (column 6, lines 11 to 15: Figures 1 and 3);

"the set includes a power of the enhancement signal, determined over a finite-support window" – an autocorrelation function calculation circuit 352 calculates an autocorrelation function $R(m)$, which is the power of the impulse response $h_w(n)$; impulse response $h_w(n)$ is a filter for producing the enhanced signal (column 6, lines 16 to 29: Equation (13): Figure 3); the autocorrelation function $R(m)$ is taken for a set sampling number Q, where Q is 20 or 40 (column 6, lines 11 to 15: Figure 3); thus, sampling number Q represents "a finite-support window" of samples.

Regarding claims 3 and 15, *Ozawa* discloses gain adjustment circuit 40 adjusts a gain to equal power of the reproduced signal $S(n)$ ("the power constrained by characteristics of the distorted input signal") (column 6, lines 59 to 61: Figure 1).

Regarding claims 4, 6, 16, 18, and 27, *Ozawa* discloses optionally adding a pitch postfilter (column 7, lines 32 to 39); a pitch postfilter increases a pitch component of an output signal, or increases the periodicity.

Regarding claims 5 and 17, *Ozawa* discloses:

"the analyzing step comprises a step of determining a set of parameters from the enhancement signal" – an autocorrelation function calculation circuit 352 calculates an autocorrelation function $R(m)$, which is the power of the impulse response $h_w(n)$ (column 6, lines 16 to 29: Equation (13): Figure 3);

"possible values for at least some of the set are constrained by characteristics of the distorted input signal" – gain adjustment circuit 40 adjusts a gain to equal power of

the reproduced signal *S(n)* ("the power constrained by characteristics of the distorted input signal") (column 6, lines 59 to 61: Figure 1).

Regarding claim 7, *Ozawa* discloses compensation filter 30, which acts as "feeding-back" an enhanced output signal *y(n)* to provide an additionally enhanced output signal *g(n)* (column 5, line 65 to column 6, line 58: Figure 1).

Regarding claims 8 and 26, *Ozawa* discloses gain adjustment circuit 40 adjusts a gain to equal power of the reproduced signal *S(n)* ("possible values for the power is constrained") (column 6, lines 59 to 61: Figure 1); gain adjustment circuit 40 is an additional iteration for iteratively enhancing an output signal.

Regarding claims 9 and 19, *Ozawa* discloses the autocorrelation function *R(m)* is taken for a set sampling number Q, where Q is 20 or 40, for $n = 0$ to $Q - 1 - m$ (column 6, lines 11 to 15: Figure 3); thus, Q represents a number of samples taken forward in time from time $n = 0$.

Regarding claims 11, 21, and 28, *Ozawa* discloses noise is quantization noise, which is produced by encoding a voice signal ("an artifact of encoding and decoding") (column 1, lines 14 to 25).

Regarding claims 12 and 23, *Ozawa* discloses a method for calculating transfer functions of spectrum postfilter 20, compensation filter 30, and gain adjustment circuit 40 for enhancing an output signal (Figure 1), which calculations are implicitly performed as instructions on a processor.

Regarding claim 22, *Ozawa* discloses spectrum postfilter 20, compensation filter 30, and gain adjustment circuit 40 for enhancing an output signal operate on identical signal portions (Figure 1).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ozawa* in view of *Bialik et al.*

Ozawa suggests autocorrelation function *R(m)* is taken for a set sampling number Q, where Q is 20 or 40, for $n = 0$ to $Q - 1 - m$. (Column 6, Lines 11 to 15: Figure 3) Thus, Q represents a number of samples taken forward in time from time $n = 0$. However, *Ozawa* omits determining an amount of backward-in-time sample-sequences. *Bialik et al.* teaches a pitch postfilter, where samples are taken from present frame buffer 25 and prior frame buffer 26. Data can be taken from previous subframes 20d, 20c, and 20b, and from future subframes 20e, 20f, and 20g. (Column 2, Line 65 to Column 3, Line 11: Figure 2) The objective is to provide a pitch postfilter that utilizes future and past information for at least some of the subframes to improve performance. (Column 1, Lines 31 to 49) It would have been obvious to one having ordinary skill in the art to take both backward-in-time sample-sequences and forward-in-

time sample-sequences as taught by *Bialik et al.* in the postfiltering method of *Ozawa* for the purpose of providing better performance by utilizing future and past information for a pitch postfilter.

Response to Arguments

5. Applicant's arguments filed 14 March 2005 have been fully considered but they are not persuasive.

Applicant argues that the rejection under 35 U.S.C. §102(b) is improper because *Ozawa* does not show every limitation of the rejected claims. Specifically, Applicant maintains that *Ozawa* does not disclose "determining an enhancement signal by finding a difference between the distorted input signal and the enhanced output signal" or "analyzing the enhancement signal". Applicant characterizes the statement that an enhancement signal is disclosed by Equation (12) of *Ozawa* as "simply going too far". Similarly, Applicant says that Equation (12) of *Ozawa* "might be able to be manipulated to produce the enhancement signal". Further, Applicant states that the enhancement signal is being "plucked out" of Equation (12) of *Ozawa*. Applicant says that *Ozawa* only discloses a "snippet" from Equation (12), and does not analyze the enhancement signal. Regarding claims 9 and 19, Applicant states that the "forward-in-time limitation" "means nothing" to *Ozawa*. These arguments are traversed.

It is respectively maintained that Applicant's representative's characterizations of *Ozawa* are unfair, and do not evidence a familiarity with what one having ordinary skill in the art would know about digital filters. Saying that construing Equation (12) of

Ozawa as disclosing an enhancement signal as a difference is "simply going too far", "might be able to be manipulated", and "plucks out" "a snippet" does not address the basis of the rejection. Applicant's representative is encouraged to consult a standard textbook on digital filters, *e.g. Rabiner and Shafer*'s Digital Processing of Speech Signals, Prentice-Hall, 1978, or Pages 1468 to 1471 of *Ramamoorthy et al.*, Applicant's own cited prior art.

One skilled in the art would know that a compensation filter generates an enhancement signal. *Ozawa* calculates a series of postfilters, where the transfer function *H(z)* represents a modification of the signal produced by a postfilter. Parameters of a transfer function *H(z)* are a plurality of linear prediction coefficients, a_i, b_i, c_i. Thus, each filter of *Ozawa*, *i.e.* spectrum postfilter 20 and compensation filter 30, produces an iterative enhancement of input signal *S(n)*. Applicant's Specification, Pages 2, 4, and 6, defines enhancement in terms of postfiltering. Nothing in Applicant's Specification indicates that the term "enhancement" is to be construed to imply anything else but applying a digital filter to correct an original signal.

Ozawa's Equation (12) does disclose "determining an enhancement signal by finding a difference between the distorted input signal and the enhanced output signal". *S(n)* is the distorted input signal, and *y(n)* is the desired output signal to be obtained by spectrum postfilter 20. The two terms on the right hand side of Equation (12) simply represent the transfer function of the spectrum postfilter 20 by linear prediction coefficients a_i and c_i, where the transfer function of the spectrum postfilter 20 is designed to enhance the distorted input signal *S(n)* through calculation of appropriate

linear prediction coefficients a_i and c_i. (Column 5, Lines 31 to 64) In effect, the transfer function *H(z)* of a postfilter is designed to subtract a component from a distorted input signal to obtain an enhanced output signal. All of this is standard in the art of digital filters.

Similarly, calculation of compensation filter 30 involves "analyzing the enhancement signal". The term "analyzing" should be broadly construed. Compensation filter coefficient calculation circuit 35 of *Ozawa* determines the transfer function *H(z)* of compensation filter 30 by analyzing linear prediction coefficients a_i and c_i, of the spectrum postfilter 20. (Column 6, Lines 1 to 58: Figure 1) The transfer function *H(z)* of compensation filter 30 then includes a new set of linear prediction coefficients ε_i. These linear prediction coefficients ε_i represent a further iteration of enhancement by the postfilter. Thus, *Ozawa* discloses analyzing the enhancement signal".

During patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification." *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969)

Regarding claims 9 and 19, *Ozawa* discloses samples sequences that are forward-in-time because those skilled in the art would know that samples are taken forward-in-time unless stated to the contrary. Generally, when samples are stored in a

buffer, linear prediction coefficients may be calculated from forward-in-time samples or backward-in-time samples. As an example, a signal can be smoothed starting from any arbitrary point in time either with respect to future samples, or past samples, or both. Thus, Applicant's implication that autocorrelation functions are arbitrary with respect to forward or backward components is not true. Conventionally, a sample sequence is forward-in-time unless contrarily noted.

Therefore, the rejections of claims 1 to 9, 11 to 19, and 21 to 28 under 35 U.S.C. §102(b) as being anticipated by *Ozawa*, and of claims 10 and 20 under 35 U.S.C. §103(a) as being unpatentable over *Ozawa* in view of *Bialik et al.*, are proper.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (703) 308-9064. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ML
5/24/05

Martin Lerner

Martin Lerner
Examiner
Group Art Unit 2654